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Emotion Regulation and its Effects on Mood Improvement in Response to an In Vivo Peer Rejection Challenge

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This study examined children's spontaneous use of behavioral emotion regulation (ER) strategies and their effects on subsequent mood change in response to an in vivo peer rejection manipulation. Participants ($N = 186$), ranging between 10 and 13 years of age, played a computer game based on the television show *Survivor* and were randomized to either peer rejection (being voted out of the game) or nonrejection control. In response to rejection, more than one third of the participants (38%) displayed a marked worsening (i.e., reliable change) in state mood. After receiving feedback, time spent on several behavioral ER strategies during a 5-minute postfeedback period was assessed. At the end of the postfeedback period, children's cognitive activity was also assessed. More time spent on behavioral distraction was positively linked to subsequent increases in positive affect, whereas the reverse pattern was found for disengagement/passive behavior. Moreover, higher endorsement ratings for the strategy of "cognitive analysis" were associated with stronger increases in negative affect.

Keywords: emotion regulation, in vivo assessment, preadolescent children, peer rejection, mood improvement

Contemporary theorists have highlighted that emotions typically involve coordinated changes in distinct response systems (i.e., physiology, motor behavior, feelings, expression, and cognitive processes) that are called forth when people evaluate a situation as offering important challenges or opportunities (e.g., Frijda, 1988; Rottenberg & Gross, 2003; Thompson, 1994). Emotions refer to quick-moving response tendencies that prepare an individual for situationally appropriate actions that have generally proven valuable over evolutionary time (Gross, 1999; Tooby & Cosmides, 1990). People often express these emotional response tendencies, but they have the capacity to modulate them, and this important ability to regulate both positive and negative emotions figures prominently in human functioning (Frijda, 1986; Gross, 1998; James, 1884).

Emotion regulation refers to changes in the intensity and/or duration of activated emotions (Cole, Martin, & Dennis, 2004). The literature on the development of emotion regulation during childhood suggests a developmental sequence in which infants soon start to use rudimentary forms of autonomous emotion regulation, including gaze aversion, self-sucking, and tactile stimulation (Derryberry & Rothbart, 1988; Rothbart & Bates, 1998). With increased cognitive, motor, and language development during the second through fifth years of life, the infant's repertoire of regulation strategies expands to include new and more complex use of objects (e.g., toys) and social interactions (Diener & Mangelsdorf, 1999). Other important changes during early childhood are the expansion of social networks (e.g., neighborhood peers, new siblings, teachers) and children's gradually increasing emotional understanding, which is likely to foster the use of more complex regulation strategies (e.g., Saarni, 1999).

During middle childhood, cognition takes on a more central role in the transition towards more proficiency in emotion regulation. Increasingly sophisticated cognitive abilities (i.e., children gradually acquire an understanding of the mind as an interpretative device, Carpendale & Chandler, 1996) allow for mental forms of emotion regulation that, contrary to most forms of behavioral strategies, can be used in most situations (i.e., the mind is free to wander, whereas one's ability to change objective conditions is often hampered by situational and/or social constraints). By age 10, children have acquired a firmly established understanding of the usefulness of this new mode of cognitive emotion regulation

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strategies (Harris, 1989; Stegge, Meerum Terwogt, Reijntjes, & Van Tijen, 2004).

As noted by Freud (1926/1959), proficiency in emotion regulation is a fundamental prerequisite for adaptive daily functioning, including feelings of general well-being, the capacity to work, and to relate to others. However, people can experience difficulties in modulating emotional expression and experience in response to contextual demands. Deficits in emotion regulation (emotion dysregulation) are implicated in half of the DSM-IV Axis-I disorders (e.g., depression, anxiety disorders, substance abuse, and eating disorders) and in the large majority of the Axis-II disorders (APA, 1994; Cole, Michel, & O'Donnell Teti, 1994; Kring & Bachorowski, 1999).

During the past two decades, emotion regulation research in adults has burgeoned (e.g., Gross & John, 2003; Gross & Levenson, 1993, 1997; Nolen-Hoeksema, 1990; Richards, 2004). Evidence with adults suggests that the strategies used to regulate one's emotions have profound effects on various domains of psychological functioning, including memory (Gross & Levenson, 1993; Richards, 2004), romantic relationships (Richards, Butler, & Gross, 2003), and dealing with trauma (Richards, Beal, Seagal, & Pennebaker, 2000). Moreover, several studies, combining experimental and naturalistic approaches, have provided evidence to suggest that two common ways to regulate emotions—reappraisal and the suppression of emotion-expressive behavior—differ considerably in the way they influence subsequent subjective experience. Specifically, reappraisal, relative to suppression, often has more positive consequences for subjective feeling state and general well-being (e.g., Gross & John, 2003; Gross & Levenson, 1997). Moreover, work by Nolen-Hoeksema and colleagues revealed marked reductions in self-reported negative affect when adult participants were assigned to engage in behavioral distraction in response to a negative mood induction procedure (i.e., self-generated imagery) in the laboratory. In contrast, adults who engaged in more ruminative responses to negative emotions were at risk for more sustained and severe distress (Nolen-Hoeksema, 1987, 1990; Morrow & Nolen-Hoeksema, 1990).

In infancy and early childhood, several researchers have examined children's use of emotion regulation strategies in real time (e.g., Buss & Goldsmith, 1998; Gilliom, Shaw, Beck, Schonberg, & Lukon, 2002; Harman, Rothbart, & Posner, 1997; Stifter & Braungart, 1995). For instance, Harman, Rothbart, and Posner (1997) aroused distress in infants by exposing them to continuous auditory and visual stimulation, and subsequently they were exposed to different types and durations of distracters to examine the time course of distress. Next, in a study among 5- and 10-month-old infants who were exposed to anger-provoking conditions, Stifter and Braungart (1995) observed temporal relations between regulatory behaviors such as self-soothing and orienting, and subsequent decreases in the activated emotion. Finally, Buss and Goldsmith (1998) examined 6-, 12-, and 18-month-olds use of purported regulation strategies in response to procedures designed to induce anger or fear. Results suggest that some regulatory behaviors (e.g., gaze aversion) were linked to subsequent decreases in anger; whereas fear intensity was not affected. Converging with findings observed among adults, these studies suggest that self-distraction and attention shifting are positively linked to short-term mood improvement.

Unlike research with young infants and adults, scant data are available with older children and adolescents on the mood effects of emotion regulation strategies in real time. Rather, the study of emotion regulation in school-age children has relied primarily on indirect approaches. The most widely used method for studying emotion regulation in this age group has been to present participants with hypothetical vignettes depicting negative emotion-eliciting situations and then have them make prospective judgments as to the type of ER strategies they would employ in the target situations, as well as the expected efficacy of each strategy in altering their negative affect (Underwood, 1997). For instance, Garber and colleagues observed that children's ratings of the mood enhancing effects of several emotion regulation strategies were inversely related to their baseline level of depressive symptoms (Garber, Braafladt, & Weiss, 1995).

A second approach for studying emotion regulation in older children is to have them retrospectively report on their responses to actual emotion-eliciting events occurring in their natural environment. This experience sampling method was employed in a study by Silk and colleagues (Silk, Steinberg, & Sheffield Morris, 2003). Adolescents between 12 and 15 years reported on their use of specific cognitive and behavioral emotion-regulation strategies in response to a self-identified emotion-eliciting experience during the hour preceding a preprogrammed beep transmitted from a wrist watch. Results revealed that greater use of disengagement strategies (e.g., denial) or involuntary engagement strategies (e.g., rumination) was linked to less effective regulation of negative affect (i.e., lower levels of mood improvement).

Several authors have noted the potential pitfalls in assuming that individuals' prospectively and retrospectively reported reactions to emotion-eliciting events correspond to how they actually respond when faced with these events in vivo (e.g., Robinson & Clore, 2002; Underwood, 1997). Cognitive and behavioral reactions to online experienced feeling states are largely governed by the appraisal of current situational conditions, which are episodic, contextual, and experiential in nature (Robinson & Clore, 2002). Conversely, reports on appraisal of and reactions to noncurrent emotion-eliciting events are based on "semantic emotion knowledge," i.e., situation-specific and/or general beliefs about emotions and the reactions these emotions are likely to elicit. Accordingly, Stone and colleagues (Stone, Schwartz, Marco, Cruise, Shiffman, & Hickox, 1998) observed marked discrepancies between coping assessed in real time and retrospective recall of coping during this same period. In a similar vein, Sandstrom and colleagues found no relationship between children's anticipated worsening in mood in response to a range of vignette-depicted peer rejection experiences and their online reported change in mood subsequent to an actual peer rejection experience in real time (Sandstrom, Cillessen, & Eisenhower, 2003).

The present study was designed to examine preadolescent children's emotion regulation when faced with an emotion-eliciting event in real time. Specifically, we investigated online the linkage between the use of certain conceptually distinct behavioral emotion regulation strategies and short term mood improvement following in vivo peer rejection. The linkage between children's retrospectively reported cognitions following rejection and changes in state mood were also examined.

We chose peer rejection as the emotion provocation based on evidence suggesting that rejection ranks among the most aversive

of human experiences and thus is associated with marked negative affect (e.g., Baumeister & Tice, 1990; Leary, Tambor, Terdal, & Downs, 1995). Moreover, rejection has a high degree of ecological validity, in that rejection by peers is a common emotion-eliciting event in childhood (Coie, 1990). Finally, peer rejection figures prominently in the development and/or maintenance of several forms of psychopathology, including externalizing behavior problems (e.g., Dodge et al., 2003), social anxiety disorder (e.g., Wells et al., 1995) and depression (e.g., Nolan, Flynn, & Garber, 2003). We selected children between the ages of 10–13 because peers assume great salience in this age group, as evidenced by data indicating that by age 11 nearly 50% of children's social activities involve peers (Grusec & Lytton, 1988). Moreover, relative to young children and adults, few studies have investigated emotion regulation in preadolescent children (von Salisch & Saarni, 2001). Finally, research in this age group has revealed the significance of the peer group in influencing children's emotion regulation in daily life. Specifically, the strict peer norm that applies to most situations is to remain "cool" and "in control" when experiencing strong negative emotions such as anger (von Salisch, 2001).

Toward our aim, we devised an experimental peer rejection challenge based on the television show *Survivor*. In brief, participants were led to believe that they, along with five other players (fictitious contestants), were voting on each other's physical and personal attributes with the ultimate aim being to vote each player in or out of the game. Participants were randomized to receive either rejection feedback (voted out by peers on the first round) or nonrejection feedback (survived first round). State mood was assessed at baseline, immediately after receiving feedback, and again after a 5-minute postfeedback period. During the postfeedback period several distinct behavioral emotion regulation strategies were made available to the participants, including problem-oriented engagement behavior, disengagement/passive behavior, and behavioral distraction.

Our selection of these specific strategies was based on several considerations. Although robust and theoretically meaningful dimensions that characterize emotion-regulation in childhood and adolescence are still underdetermined, engagement–disengagement is among the most widely used dimensions in classifying emotion regulation/coping strategies (Compas, Conner-Smith, Saltzman, Harding Thomsen, & Wadsworth, 2001). The engagement–disengagement distinction (e.g., Ebata & Moos, 1991) refers to responses oriented towards the source of stress ("approach"), and responses oriented away from the stressor, respectively. The first two strategies—problem-oriented and passive behavior—were designed to tap these qualitatively different methods of regulating affect. Behavioral distraction (i.e., engaging in inherently pleasant activities unrelated to the negative stimulus situation) was included because distraction consistently ranks among the most highly endorsed behavioral strategies among school-age children, in response to a variety of vignette-depicted emotion-eliciting events, including academic failure and peer rejection (e.g., Reijntjes, Stegge, & Meerum Terwogt, 2006; Sandstrom, 2004).

Based on research findings among young children and adults, we expected that more time spent on passive behavior would be linked to lower levels of mood improvement. Conversely, we predicted that more time spent on distracting activities would be positively associated with mood improvement. Based on evidence suggesting a linkage between engagement coping and better psychological adjustment (see Compas et al., 2001, for a review), we also predicted that more time spent on problem-oriented engagement behavior would be positively associated with higher levels of mood improvement.

Method

Participants

Participants were 186 children (92 boys, 94 girls) enrolled in 5th- and 6th-grade classes from five public elementary schools in Holland, who were predominantly from a middle-class socio-economic status (SES) background. The participants were predominantly Caucasian (94.5%) and ranged in age from 10 to 13 years ($M = 11.5$, $SD = .73$). For the initial sample of 281 children, classroom teachers sent parent permission letters home with children. Of the 234 letters returned (83%), 186 parents (79.5%) gave their consent for their children to participate in the study, and 48 (20.5%) declined. We also obtained verbal assent to perform the study from the principal of the school and each child's teacher. Children were verbally informed that they would play a computer-game against five same-age children from other schools in the same area, in which they might or might not be voted off by their coplayers. Those who had received parental permission were explained that they were not obliged to participate, and that they were free to discontinue their participation at any time.

Design

The study design consisted of a 2 × 3 mixed model repeated measures design with condition (peer rejection feedback vs. nonrejection feedback) serving as the between-subjects factor and assessment phase (baseline, immediately postfeedback, and 5-minute postfeedback) serving as the repeated measures factor. Children were matched on age and gender and randomly assigned to the experimental condition (peer rejection) or the control condition (nonrejection condition). Because the present study aimed to examine children's mood change/improvement in response to peer rejection (as opposed to the nonrejection control condition), we intentionally randomized more participants to the peer rejection condition. The ratio of children randomized to the experimental group versus the control group was 3:2. This approach resulted in 113 children randomized to the failure feedback condition, while the other 73 children were randomized to the control condition.

Procedure

The experimental session was carried out in a quiet room on the school grounds. While being accompanied individually from their class to the testing room, participants were told that their class was selected to take part in a new Internet game called "SURVIVOR." In reality, the game was a computer program written in Visual Basic designed to present the illusion of playing a game online with five other children (see description below). To provide a credible rationale for the repeated administration of the Positive and Negative Affect Schedule (PANAS), participants were also told that they would complete questionnaires at several points because the designers of the game were curious to know how children felt while playing the game.

Survivor computer game. We devised an Internet simulation peer rejection manipulation based on the American television show *Survivor*. In brief, participants were led to believe that they, along with five other players from other schools (in reality, the other players were fictitious), were voting on each other's physical and personal attributes with the ultimate aim being to become the only remaining player to have not been voted out by the other players (i.e., the Survivor Champion). Prior to the start of the game (Time 1), participants completed a baseline mood measure, i.e., the Dutch translation of the PANAS (Watson, Clark, & Tellegen,

1988). Participants were informed that because of some technical difficulties, the game might be temporarily interrupted. Participants were also told that should such an interruption occur, there would be several activities they could do while they waited for the problem to be corrected. In actuality, the technical difficulties always occurred at the same point during the game (i.e., postfeedback) to provide participants the opportunity to engage in one or more activity choices designed to represent distinct behavioral emotion regulation strategies during a standard 5-minute postfeedback period.

Participants progressed through the game at their own pace by examining each of the five fictitious player profiles, which included their picture along with relevant personal information (e.g., favorite musical groups, hobbies). Subsequent to viewing the last player profile, the participant voted one of the five fictitious coplayers out of the game. Immediately after voting, a message appeared on the screen indicating that the computer was counting the votes of the other players to determine who would be voted out of the game. Following a 5 second waiting period, the name of the rejected player appeared on the screen. In the experimental condition the name of the participant was displayed, whereas in the control condition the name of one of the alleged coplayers appeared.

Five seconds after receiving feedback (Time 2), participants were readministered the PANAS. Instructions emphasized the importance of rating how they felt right now. After completing this measure, a warning appeared on the computer screen indicating that a technical problem had occurred and that there would be an approximate 5-minute delay while the problem was being corrected. Participants were offered several possible behavioral activities during the waiting period. These alternative activities were designed to tap conceptually distinct behavioral emotion regulation strategies and included: Reading popular comic books or listening to popular music through headphones on a portable CD player (behavioral distraction); perusing the contents of two separate folders containing information on 20 previous Survivor Game contestants; 10 alleged winners and 10 alleged losers (behavioral engagement/approach); or merely sitting quietly and waiting (disengagement/passive response). The regulatory behaviors were counterbalanced in terms of the order suggested. Moreover, to avoid the complexities that might result from participants taking on several behavioral strategies simultaneously, children engaged in the behavioral activities at two different activity stations located at separate tables in different corners of the room (approximately 3 meters apart). One station was devoted to the distraction activities (i.e., CD player and the comic books), whereas the other station contained the folders of previous game contestants for examining approach behavior.

The time spent on each of the above activities during the 5-minute waiting period was recorded unobtrusively by the experimenter. Following the 5-minute postfeedback waiting period (Time 3), participants were readministered the PANAS a third time. In addition, children randomized to the rejection condition completed a thought endorsement measure designed to assess specific self-referent thoughts concerning the game (see below). After completing these measures, the participant was accompanied to an adjacent room where a female research assistant then debriefed the child thoroughly.

Debriefing. Each child was thoroughly debriefed with the aim of removing any lingering effects of the false rejection feedback while playing the Survivor Game. During the debriefing, the child was informed that the other coplayers were fictitious and that most of their classmates were voted out in order to see how they would respond to that difficult situation. The credibility of the deception manipulation was also assessed during the debriefing by asking each participant whether they had believed that they were playing against other players. With no exception, participants indicated that they had believed that the game was genuine. At the conclusion of the debriefing, participants were urged to observe complete secrecy by not talking with their classmates about the Survivor Game until all the other children had finished playing. To increase adherence to this instruction, children were asked to sign a nondisclosure agreement and were then provided a choice of one of several possible small gifts for playing the game (e.g., a small tape recorder, a gift certificate worth about 3 dollars).

Most participants displayed (marked) relief upon being informed that the rejection experience was bogus. Moreover, most children reported that they understood the purposes of the research, along with the necessity of having been deceived. Most importantly, when asked, none of the participants made mention of any feelings of regret with regard to participation. On the contrary, several children—spontaneously—reported to consider the rejection experience an unnerving, but useful experience. Finally, all participants reported that prior to playing they had not talked with classmates about the Survivor Game.

Measures

Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988)

For the purposes of the present study, the English version of the PANAS was translated into Dutch. The 20-item instrument was administered to assess participants' changes in positive and negative affect. Briefly, positive affect reflects the extent to which a person feels enthusiastic, active, and alert. In contrast, negative affect is a general dimension of subjective distress and unpleasurable engagement that subsumes a variety of aversive mood states, including anger, contempt, disgust, fear, and nervousness. The two mood factors have emerged as distinctive orthogonal dimensions in factor analytic studies of affect (Watson, Clark, & Tellegen, 1988). Respondents were presented a series of mood-related adjectives (e.g., distressed, ashamed) and asked to rate their current feeling state on a 5-point scale ranging from "very slightly or not at all" to "extremely." The wording was slightly modified for children. The English version of the PANAS has adequate internal consistency, test-retest reliability, convergent validity, and predictive validity (Watson & Clark, 1992). In the present sample, the reliability coefficient (coefficient alpha) was .70 for the negative affect subscale, and .74 for the positive affect subscale. The two subscales were unrelated ($r = .08$, $p > .10$).

Directly Observed Behavioral Emotion Regulation Strategies

During the 5-minute waiting period, several possible behavioral activities were made available. Participants were explained that they could self-select their activities. Time spent in seconds on each of the regulation strategies was unobtrusively recorded by the experimenter. The specific strategies included:

Behavioral distraction. This strategy was indexed as time spent reading popular comic books or listening to popular music through headphones on a portable CD player.

Problem-oriented engagement behavior. This strategy was indexed as time spent viewing folders of 20 previous Survivor Game contestants (contestants were actually fictitious). Time spent viewing folders of losers and winners was recorded separately.

Disengagement/passive behavior. This strategy was indexed as time spent sitting quietly without engaging in any of the other activity categories listed above.

Thought Endorsement Measure

A five-item author-constructed measure was developed for this study to assess children's cognitive reactions to the rejection feedback. At Time 3, children were presented exemplars for each cognitive reaction dimension and instructed to rate, on a scale ranging from 1 (not at all) to 5 (almost all the time), the extent to which they had experienced that thought during the five min. waiting period.

In developing our specific cognitive reactions/strategies, we examined existing questionnaires and coding schemes designed to assess cognitive emotion regulation and coping strategies (e.g., Ayers, Sandler, West, & Roosa, 1996; Gross, 1998; Parkinson & Totterdell, 1999; Sandler, Tein, & West, 1994). Two strategies (i.e., positive reappraisal and mental distraction) were borrowed directly from these existing measures. The other strategies were chosen based on our previous work (Stegge, Meerum Terwogt, Reijntjes, & van Tijen, 2004) and the previously discussed engagement-disengagement dimension. Similar to the commonly used "Kidcope" measure (Spirito, Stark, Gil, & Tic, 1995), each cognitive reaction dimension was represented by a one-item exemplar. The specific cognitive reactions/strategies that were employed in the present study are presented below.

Cognitive Engagement Strategies

Cognitive analysis. This strategy involves cognitive activity focused on the negative event; i.e., "I thought about why the other children voted me out."

Positive reappraisal. This strategy involves reframing the negative event as less negative, benign, or positive; i.e., "I thought to myself that it is not that important anyway."

Catastrophizing. This strategy involves exaggerating the perceived consequences of the negative event; i.e., "I had thoughts like you see, nobody likes me."

Cognitive Disengagement Strategies

Mental distraction. This strategy involves engaging in thoughts unrelated to the negative event (i.e., "I thought of other matters than the Survivor Game.").

Mental avoidance. This strategy involves active efforts to not engage in thoughts related to the negative event (i.e., "I tried to avoid thinking of the Survivor Game.").

Results

Manipulation Check: Effects of Rejection Feedback on Reported Mood

Mood scores across the three assessment points for both conditions are presented in Table 1. The immediate mood effects of the rejection feedback were examined using a condition (rejection vs. non- rejection control) by time (baseline vs. postfeedback) doubly multivariate repeated measures analysis across the two mood indices (i.e., PANAS-P and PANAS-N). This analysis revealed significant main effects for both condition [Wilks' Lambda $F(2, 179) = 7.03$, $p < .001$] and Time [Wilks' Lambda $F(2, 178) = 15.48$, $p < .001$], which were qualified by a significant condition by time interaction [Wilks' Lambda $F(2, 179) = 57.52$, $p < .001$]. Subsequent simple effects analyses revealed that participants receiving rejection feedback reported a significant worsening of their mood across both mood indices [Wilks' Lambda $F(2, 107) = 71.58$, $p < .001$; see Table 1]. In contrast, participants assigned to the nonrejection feedback control condition reported a significant improvement in mood [Wilks' Lambda $F(2, 71) = 7.44$, $p < .002$], as evidenced by a significant increase on the positive affect scale of the PANAS [$F(1, 72) = 13.46$, $p < .001$]. The between group effectsizes (experimental vs. control) for the mood indices were .37 and .06 for the PANAS-P and PANAS-N respectively. These findings indicate that the manipulation was successful in eliciting differential affective reactions in the expected direction as a function of feedback valence.

Table 1
Means (and Standard Deviations) for State Mood Indices at Baseline (Time 1), Immediately Postfeedback (Time 2), and 5 Minutes Postfeedback (Time 3) by Condition

	Rejection		
Mood measure	RC–Yes ($n = 43$)	RC–No ($n = 70$)	Control ($n = 73$)
PANAS-P Time 1			
M	30.21	26.61	28.29
SD	5.89	6.04	6.56
PANAS-P Time 2			
M	22.44	23.88	30.03
SD	7.26	7.03	7.51
PANAS-P Time 3			
M	25.26	24.29	28.56
SD	7.84	7.13	8.10
PANAS-N Time 1			
M	13.37	13.03	13.56
SD	2.83	2.86	3.11
PANAS-N Time 2			
M	17.49	12.81	13.45
SD	4.85	2.58	3.22
PANAS-N Time 3			
M	15.67	12.40	13.72
SD	5.24	2.69	3.69

Note. RC = reliable change; PANAS = Positive and Negative Affect Schedule.

The above comparison of mean changes in state mood across the two conditions provides minimal information on the variability of mood change within the group of children randomized to the rejection condition. To identify those children who clearly showed an emotional response to the rejection manipulation, we computed a two-level emotional response classification. Specifically, following the approach outlined by Jacobson and Truax (1991), children were classified as displaying manifest mood change, yes or no. Manifest mood change on each of the PANAS subscales was defined as showing reliable change (RC, see Christensen and Mendoza, 1986) from pre to postrejection feedback. If the value of RC is greater than 1.96, it is most likely ($p < .05$) that the posttest score is reflecting real change, as opposed to the fluctuation of an imprecise measuring instrument. These analyses revealed that 43 children (38.1%) experienced a marked detoriation in state mood, as evidenced by RC on either the PANAS-N ($n = 26$), or the PANAS-P ($n = 24$), or both subscales ($n = 7$). The remaining 70 children in the rejection group showed no RC change in state mood on either subscale.

Mood Change During the 5-Minute Postfeedback Waiting Period

Changes in the two mood indices during the waiting period were examined using a condition (rejection vs. nonrejection) by time (Time 2 vs. Time 3) doubly multivariate repeated measures analysis. Results revealed a significant effect for condition [Wilks' Lambda $F(2, 178) = 13.14$, $p < .001$], no significant effect for time, and a significant condition by time interaction [Wilks'

Lambda $F(2, 178) = 15.85$, $p < .001$]. Subsequent simple effects analyses revealed that controls showed significant reductions in mood as assessed by the positive affect scale of the PANAS, $F(1, 70) = 11.33$, $p < .01$.

In contrast, participants receiving rejection feedback showed significant mood improvement from Time 2 to Time 3 across both mood indices (p's $< .01$).

Next, for the rejected group we repeated the above analysis comparing those who displayed reliable change (RC) in state mood from Time 1 to Time 2 vs. those who did not display RC. Results revealed a significant effect for group [Wilks' Lambda $F(2, 107) = 18.35$, $p < .001$], a significant effect for time [Wilks' Lambda $F(2, 107) = 16.47$, $p < .001$], and a significant group by time interaction [Wilks' Lambda $F(2, 107) = 6.77$, $p < .01$]. Subsequent simple effects analyses revealed that mood did not change from Time 2 to Time 3 among rejected children who did not display RC from Time 1 to Time 2 (p's $> .10$). Conversely, those who did display RC showed significant mood improvement from Time 2 to Time 3 across both subscales ([Wilks' Lambda $F(2, 41) = 15.12$, p's $< .01$).

Behavioral ER Strategies Predicting Mood Improvement Following Rejection

Data pertaining to rejected participants' use of behavioral ER strategies during the waiting period are presented in Table 2. A MANOVA-analysis revealed no significant differences between the two groups (i.e., RC–yes vs. RC–no) in their strategy use.

For children displaying RC, we examined the effects of the behavioral ER strategies, gender, and their interaction in predicting change in positive and negative affect from Time 2 to Time 3. Separate hierarchical regression analyses were performed for each of the two PANAS subscales. In these analyses, residualized mood change scores from Time 2 to Time 3 served as the dependent variable. In each analysis, one of the targeted ER strategies and gender were entered in Step 1. The interaction between gender and the targeted strategy was entered in Step 2. This analysis was repeated for each of the behavioral ER strategies.

Table 2
Observed Behavioral Activities During the 5-Minute Postfeedback Waiting Period

	Rejection		
Observed behavior	RC–Yes ($n = 43$)	RC–No ($n = 70$)	Control ($n = 73$)
Listening to music or reading comic books (% of time)			
M	64.7	56.3	88.1
SD	42.8	46.2	27.0
Viewing folders of winners (% of time)			
M	8.4	15.1	4.0
SD	20.8	22.3	11.6
Viewing folders of losers (% of time)			
M	12.3	14.9	1.6
SD	25.5	23.6	6.5
Sitting quietly (i.e., passive response) (% of time)			
M	14.6	13.7	6.3
SD	31.9	32.5	22.1

Note. Numbers in each column add up to 100% (300 sec.). RC = reliable change.

Consistent with expectations, results revealed that more time spent on behavioral distraction was positively associated with mood improvement as assessed by the PANAS-P, $\beta = .18$, $R^2_{change} = .03$, $F_{change} = 3.50$, $p < .04$ (one-tailed). Conversely, also consistent with expectations, more time spent on passive behavior was negatively associated with mood improvement as assessed by the PANAS-P, $\beta = -.17$, $R^2_{change} = .03$, $F_{change} = 3.37$, $p < .04$ (one-tailed). No other effects for behavioral strategies, gender, or their interaction were observed.

Next, using an identical analytic approach, we examined the effects of the behavioral ER strategies, gender, and their interaction in predicting change in positive and negative affect from Time 2 to Time 3 for rejected children not displaying RC, and for controls. None of these analyses yielded significant effects.

Cognitive Reactions Predicting Mood Improvement Following Rejection

Data pertaining to rejected participants' reported cognitive reactions during the waiting period are presented in Table 3. A MANOVA across the five cognitive reaction dimensions, with group (RC–yes vs. RC–no) serving as the between-subjects factor revealed a significant multivariate effect, Wilks' Lambda $F(5, 105) = 2.82$, $p < .02$. Subsequent univariate analysis showed that this effect was significant for cognitive analysis, $F(1, 109) = 4.79$, $p < .04$. As can be seen in Table 3, children in the RC–yes group endorsed higher levels of this cognitive strategy/reaction than those in the RC-no group.

For children displaying RC, we examined the effects of the cognitive reactions, gender, and their interaction in predicting change in positive and negative affect from Time 2 to Time 3. Separate hierarchical regression analyses were performed for each of the two PANAS subscales. In these analyses, residualized mood change scores from Time 2 to Time 3 served as the dependent variable. In each analysis, one of the targeted cognitive reactions and gender were entered in Step 1. The interaction between gender and the cognitive reaction was entered in Step 2. This analysis was repeated for each of the cognitive reactions/strategies.

Results revealed that endorsement ratings for cognitive analysis accounted for significant variance in mood change as assessed by the PANAS-N. Specifically, higher ratings for this strategy were associated with significant worsening of mood, $\beta = .27$, $R^2_{change} = .07$, $F_{change} = 6.72$, $p < .01$. Next, we repeated these same analyses for rejected children not displaying RC. Results showed a similar effect for cognitive analysis, $\beta = .24$, $R^2_{change} = .06$, $F_{change} = 5.16$, $p < .03$. None of the other cognitive strategies accounted for significant variance in mood change from Time 2 to Time 3 in either group.

Discussion

The present study sought to examine the role of several behavioral emotion regulation strategies in predicting short-term mood improvement subsequent to an in vivo peer rejection challenge. To our knowledge, this is the first study to investigate preadolescents'

Table 3
Cognitive Reactions During the 5-Minute Postfeedback Waiting Period

Cognitive reaction dimension	Rejection		
	RC–Yes (n = 43)	RC–No (n = 70)	Total (n = 113)
Cognitive analysis			
M	2.81	2.41	2.57
SD	.96	.93	.96
Positive reappraisal			
M	2.67	2.26	2.42
SD	1.25	1.00	1.12
Catastrophizing			
M	1.86	1.54	1.67
SD	1.01	.85	.93
Mental distraction			
M	2.56	2.82	2.72
SD	1.08	1.12	1.11
Mental avoidance			
M	2.16	1.76	1.92
SD	1.09	1.02	1.06

Note. Scores range from 1 (not at all) to 5 (extremely). RC = reliable change.

emotion regulation in response to an experimentally manipulated, ecologically relevant emotion-eliciting event in real time. Moreover, the inclusion of a thought endorsement measure provided the opportunity to examine how children's cognitive activity is associated with short-term mood improvement. Data on participants' changes in state mood in response to the experimental manipulation revealed that more than one third (38%) of the rejected children experienced a marked worsening of state mood, as indexed by reliable change on one or both of the PANAS subscales. Moreover, our debriefing interviews revealed that children were involved in the Survivor Game and that none of the participants reported being aware that the feedback they received was bogus. Taken together, these data suggest that the Survivor Game was successful in achieving its major objective of providing a credible and ecologically relevant paradigm for the investigation of the prospective linkage between the use of ER strategies and mood improvement subsequent to a negative emotion-eliciting event.

The results of the present study reveal that children who showed a marked emotional response to rejection feedback experienced significant mood improvement during the 5-minute postfeedback period. In agreement with expectations, as these children spent more time on behavioral distraction, they reported higher levels of mood improvement. These findings are consistent with the hypothesis that shifting one's attention away from one's distress and on to pleasant activities is likely to provide positive reinforcement that may improve one's mood state. Moreover, distraction may foster the deferral of negative self-contemplation until after the decrease in mood has subsided (Nolen-Hoeksema, Morrow, & Fredrickson, 1993).

Our findings also revealed that for children who showed a marked emotional response to rejection, more time spent on passive responses was significantly associated with lower levels of mood improvement as assessed by the PANAS-P. What might account for this finding? One explanation is that those who respond passively to worsening of mood are more prone to negative pessimistic thinking and may therefore display less mood improvement following the negative event. However, not in line with such an account, post-hoc analyses showed that time spent on passive behavior was not significantly associated with endorsement ratings for any of the cognitive reaction dimensions sampled during the postfeedback period. Another explanation is that by responding passively children do not engage in behaviors that may provide positive reinforcement and/or a sense of control. Moreover, the failure to engage in active, instrumental behavior may foster feelings of helplessness and lowered expectancies for future success (Nolen-Hoeksema, 1991).

Contrary to the observed effects for the strategies of distraction and passivity, time spent on perusing folders of either losers or winners was not associated with subsequent change in mood. Hence, where engagement/approach coping has been consistently linked with better adjustment as indexed by both internalizing and externalizing problems (Compas et al., 2001), our results suggest that these consequences in the long run may not coincide with short-term mood effects. In this context, it should be noted that we modeled our procedure after the recommendation of Gross (1999), who argued that because emotions are rapid, fluid, and micromomentary in nature, the temporal unit of analysis in emotion regulation research should consist of relatively brief periods (i.e., seconds or minutes).

Our findings on the linkage between behavioral distraction and subsequent mood change are in agreement with previous work among young children and adults (e.g., Morrow & Nolen-Hoeksema, 1990). Moreover, our findings on the strategy of passive behavior are in line with a recent study on emotion regulation among young adolescents which has provided evidence to suggest that responding to negative emotions with greater levels of disengagement, including inaction, is inversely related to the effective down-regulation of negative affect (Silk et al., 2003).

However, where the present study demonstrated a positive association between time spent on distracting activities such as reading comic books and subsequent increases in positive affect, Silk and coworkers found no support for the efficacy of this strategy in down-regulating negative affect. What might explain this discrepancy in findings? One possibility is that differences in methodologies employed across the two studies may account for the observed divergence in findings (e.g., online assessment versus retrospectively obtained data, behavioral observation of ER strategy use versus reliance on self-report measures). Alternatively, it may be that the effects of ER strategies on subsequent mood change differ for positive and negative affect. Consistent with this argument, the behavioral ER strategies included in the present study specifically predicted subsequent changes in positive affect, whereas endorsement ratings for cognitive analysis were specifically linked to changes in negative affect during the follow-up period.

Not surprisingly, children endorsing higher levels of cognitive analysis also reported stronger increases in negative affect. Interestingly, we observed this same linkage between cognitive analysis and change in negative affect among rejected children who did not display RC. Conversely, our findings revealed significantly higher ratings for cognitive analysis among children displaying RC, relative to those who did not. Hence, our findings may indicate that cognitive analysis is an ER strategy that prospectively predicts a slower decline in negative affect. However, we cannot rule out the

possibility that higher ratings for cognitive analysis are merely an epiphenomenon of children's change in negative affect during the waiting period.

Several features of the present study deserve further comment. With regard to ecological validity, we acknowledge that our laboratory manipulation of peer feedback is not identical to the peer rejection experiences children in this age range may typically encounter in their daily lives. However, exclusion from group activities is a primary exemplar of peer rejection (Bush & Ladd, 2001; Coie, 1990). In addition, especially during the past decade, being evaluated while playing a game with unfamiliar peers has become widespread in television shows and should by now probably be considered a natural part of young adolescents' contemporary daily life.

Also note that this investigation represents only a narrow slice of the multifaceted construct of emotion regulation. An important contribution of the present study is that it provides further support for the view that negative and positive affect regulation may share some similarities, determinants, and qualities but represent distinct processes (e.g., Bryant, 1989; Gross, 1999; Larsen, 2000). However, a limitation of the present study is that our data do not capture the dynamic and reciprocally determined nature of emotional responding as it occurs in ongoing streams of such cycles (Gross & Munoz, 1995). Moreover, where stable individual differences in the use of ER strategies have been shown to have important implications for people's affect, well being, and social relationships (Gross & John, 2003), the present study was not designed to examine linkages between such individual differences and affective outcomes. Caution should be exercised in interpreting the findings pertaining to cognitive analysis, given that it was assessed retrospectively and shares method variance with our measures of positive and negative affect. It should also be noted that our findings refer to the regulation of two broad mood/affect factors, not the regulation of discrete emotions such as anger or fear. Future research is needed that examines emotion regulation across different emotions.

Finally, an important feature of the present study is that we allowed children to self-select one or more behavioral emotion regulation strategies in response to the peer rejection feedback. In so doing, we did not specifically instruct children to select activities that would make them feel better. This naturalistic approach (i.e., in real life children are often faced with having to manage their negative emotions to events without explicit instructions from others) has the advantage of high ecological validity. However, one disadvantage of allowing children to self-select strategies is that we cannot exclude the possibility that the associations between strategy use and subsequent mood change are driven by one or more unknown third variables. Future work should address this limitation by randomly assigning children to various ER-strategy conditions, which also allows for disentangling the effects of personality variables (e.g., gender, anxiety, self-esteem) from ER strategy usage, as well as providing the opportunity to assess how these variables interact with strategic variables. Research along these lines is likely to yield a considerable contribution to the understanding of children's emotion regulation and ways to enhance it.

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(*Appendix follows*)

Appendix

Verbatim Instructions Provided to Participants Before Playing the Survivor Game

Please take a seat. In a moment, you will start playing the Survivor Game against five other same-sex children your age from other schools in the same area. Information on the rules and objectives of the game will be displayed on the computer screen shortly when you start playing the game. We would like you to read this information carefully at your own pace. However, before you start playing, we want to give you some additional information and instructions. First, we'll take a picture of you using a web-cam. Your picture will then be transmitted over the Internet so that all the other players know what you look like. You will also get to see the pictures of your coplayers. Moreover, we want to ask you to fill in this questionnaire (i.e., the PANAS). It is meant to assess how you feel right now, at this moment. Although you may find it somewhat boring, you will have to complete this same measure at two other points in time while playing. The reason for doing that is that the designers of the game are curious to know how children feel before, during, and after playing the Survivor Game. This may enable them to further improve the game. By the way, there are no wrong or correct answers, just report how you feel by honestly completing all items.

Before you start playing, we have to warn you that lately we have encountered some technical difficulties at other schools with this laptop computer. It may therefore be that there will be a short delay when you're playing. Should such an interruption occur, it is our experience that the problem is typically fixed within a few minutes. If this would happen again today, you do not have to feel bored. Just in case, we have some things available for you to do in case there is a delay in the game. At that table over there, there is a CD-player and several CDs with popular music, as well as a number of comic books. At that other table, you can have a look at folders of children who participated in a previous round of the Survivor Game. These folders contain pictures and personal information from these children. On the cover of each folder we have indicated whether the child in question was voted out in the first round or was a winner of his group (Note: the sequence of the presentation of these two activities was alternated). However, don't feel obliged to do anything should an interruption occur; it's perfectly ok to just wait until you can continue playing. Do you have any questions at this point? I'll stay in this room with you, so if you have any questions feel free to ask me for more explanation. Ok, I will now start the game. Good luck!

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